



U.S. Department
of Transportation

**Federal Aviation
Administration**

Program Engineering Service
Washington, D.C. 20590

Model 1 and Model 1 Full Capacity System and Hardware Volume I

**Specification for the
Flight Service
Automation System**

FLIGHT SERVICE AUTOMATION SYSTEMSPECIFICATIONVOLUME I - SYSTEM AND HARDWARE1. SCOPE.

1.1 Scope. - This specification sets forth requirements for a system to provide automation of the present Flight Service Station (**FSS**) system. This new system is called the Flight Service Automation System (**FSAS**). This specification is contained in three volumes; Volume I (**FAA-E-2683b**), and Volume III (**FAA-E-2685b**). This document is Volume I and sets forth system and hardware requirements for the Model 1 and Model 1 Full Capacity Systems. The **FSAS** will consist of two Aviation Weather Processors (**AWPs**), Flight Service Data Processing System (**FSDPS**) equipment located at **ARTCCs**, and automation and display equipment, contractor furnished, located at **FSS** facilities, to provide an alphanumeric capability. The **FSAS** manned facilities will be designated as Automated Flight Service Stations (**AFSSs**). The **FSAS** requirements include a total system responsibility from the initial design through the installation system integration and checkout, and acceptance. The **FSAS** will form an automation baseline which will be modular in both hardware and software and will provide the basic system architecture needed for modular addition of future system enhancements. The automation concept is based upon the centralized acquisition and processing of a national aviation weather and Notice-to-Airmen (**NOTAM**) data base, with the data base and updates supplied to **FSDPSs**. Automation equipment and software supplied in the **FSAS** will aid the specialists in delivery of flight services to the aviation user. Exceptions to the requirements of this volume which apply to the Model 1 system are contained in Volume III.

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2.1 General. - The following documents of the issues or amendments in effect on the date of Request for Proposals are in force to the extent specified.

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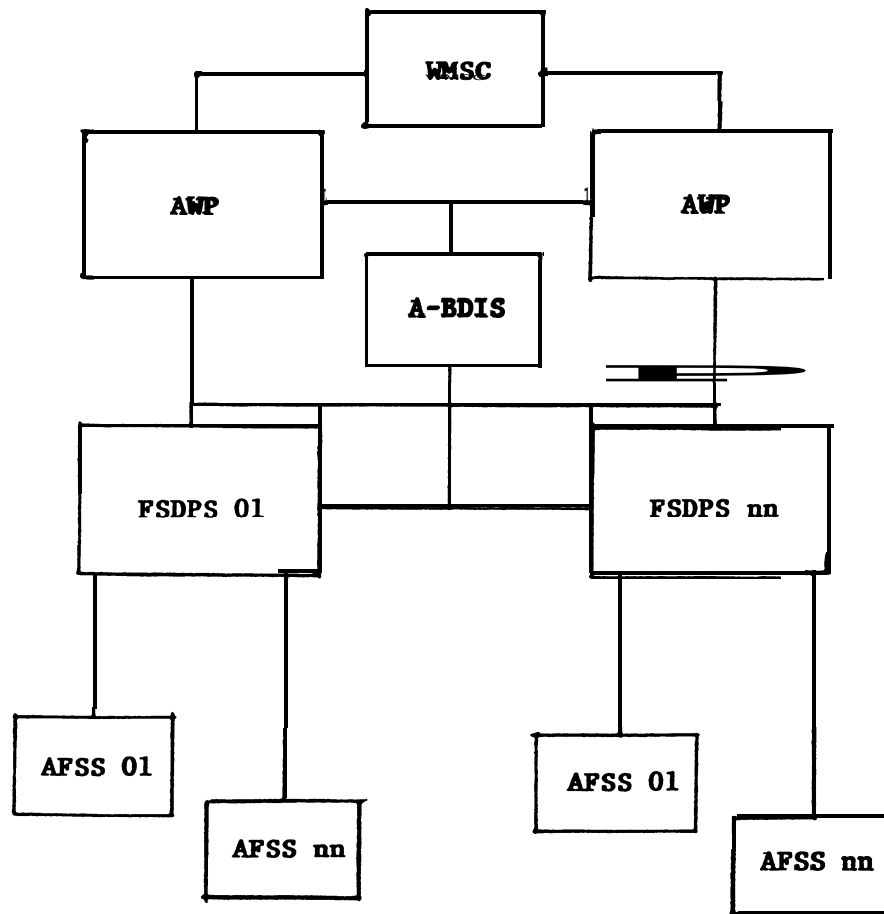


FIGURE 2

Model 1 Full Capacity

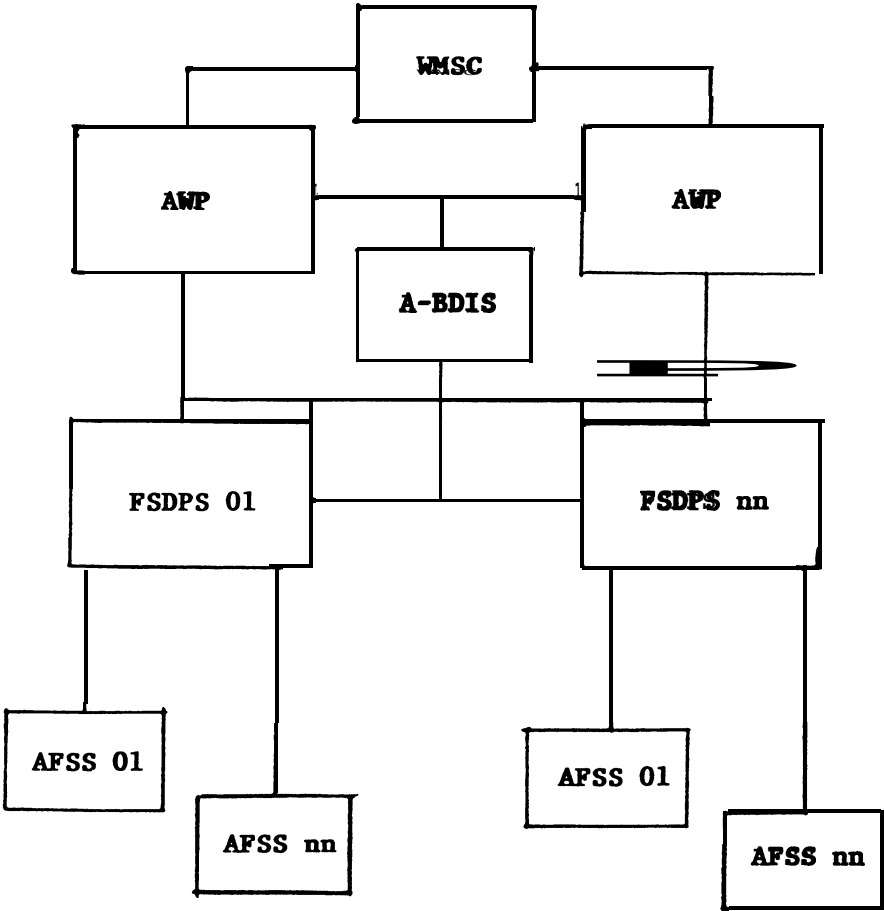


FIGURE 2
Model 1 Full Capacity

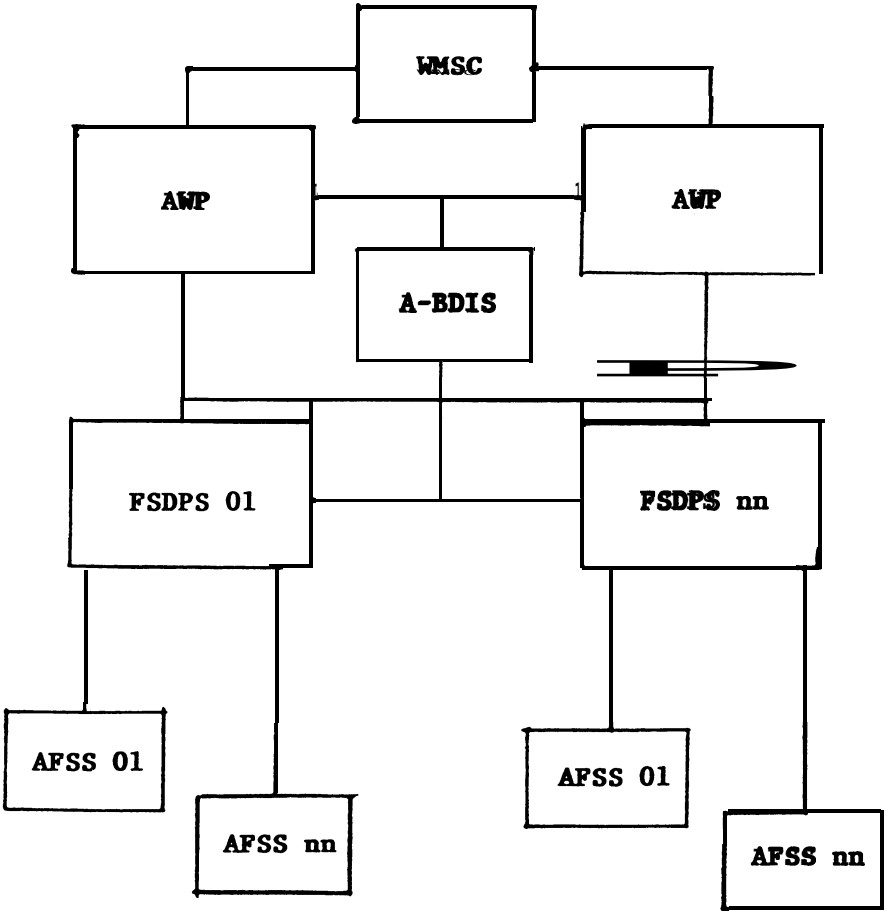


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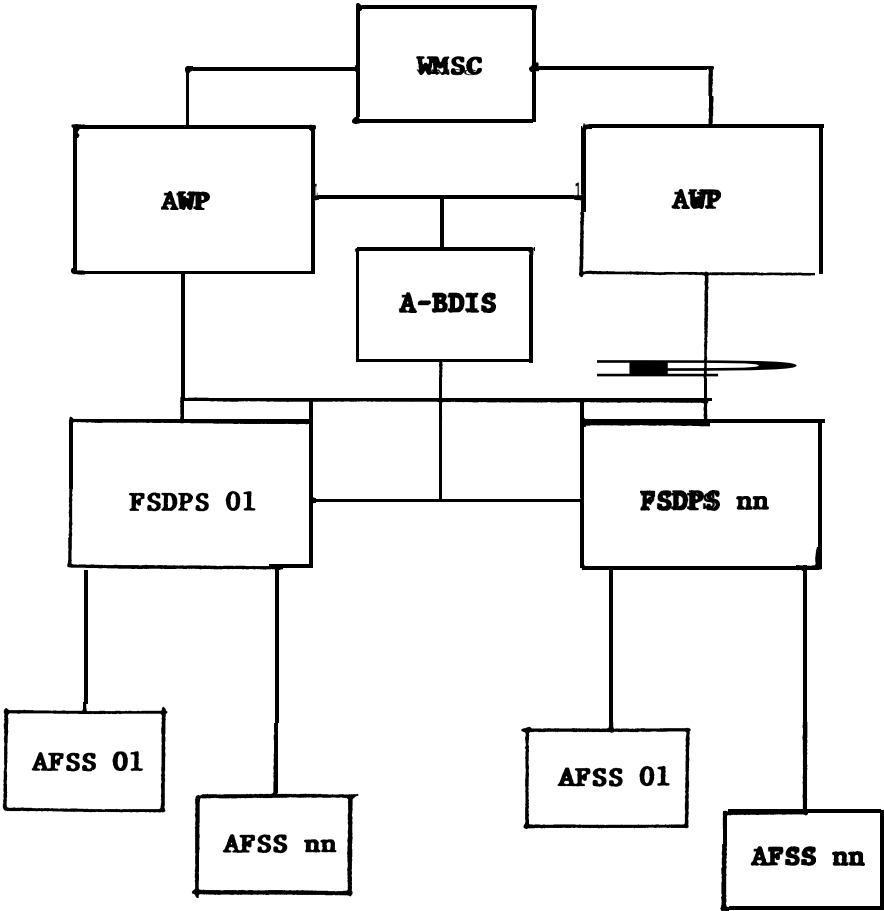


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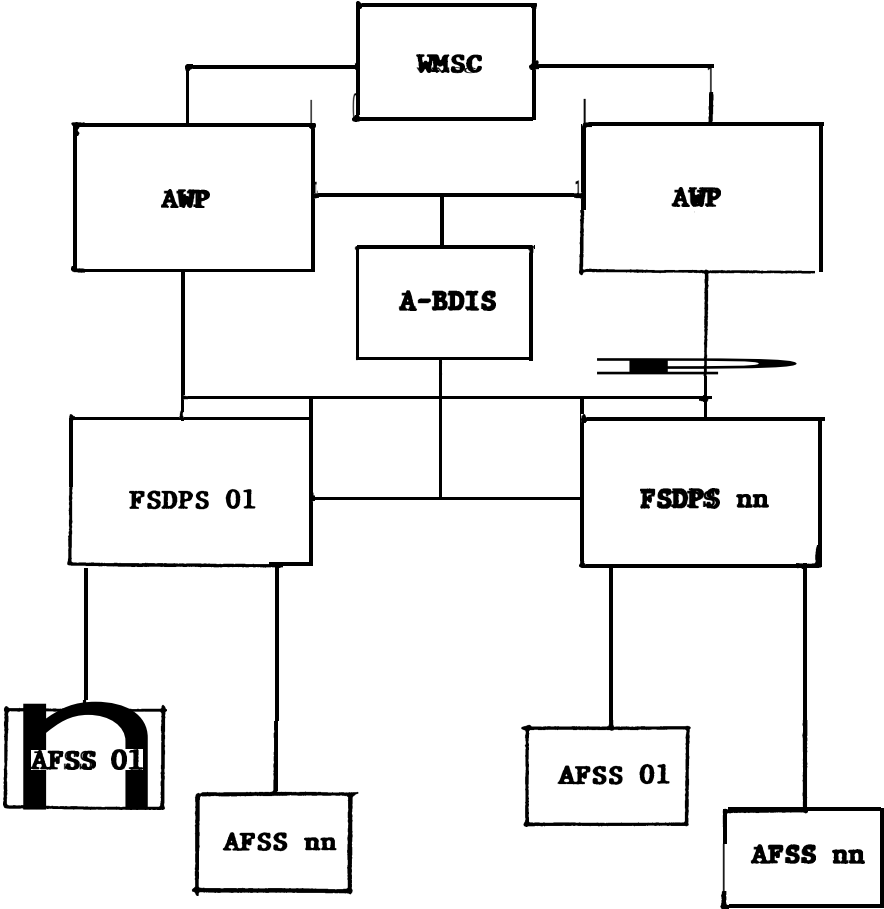


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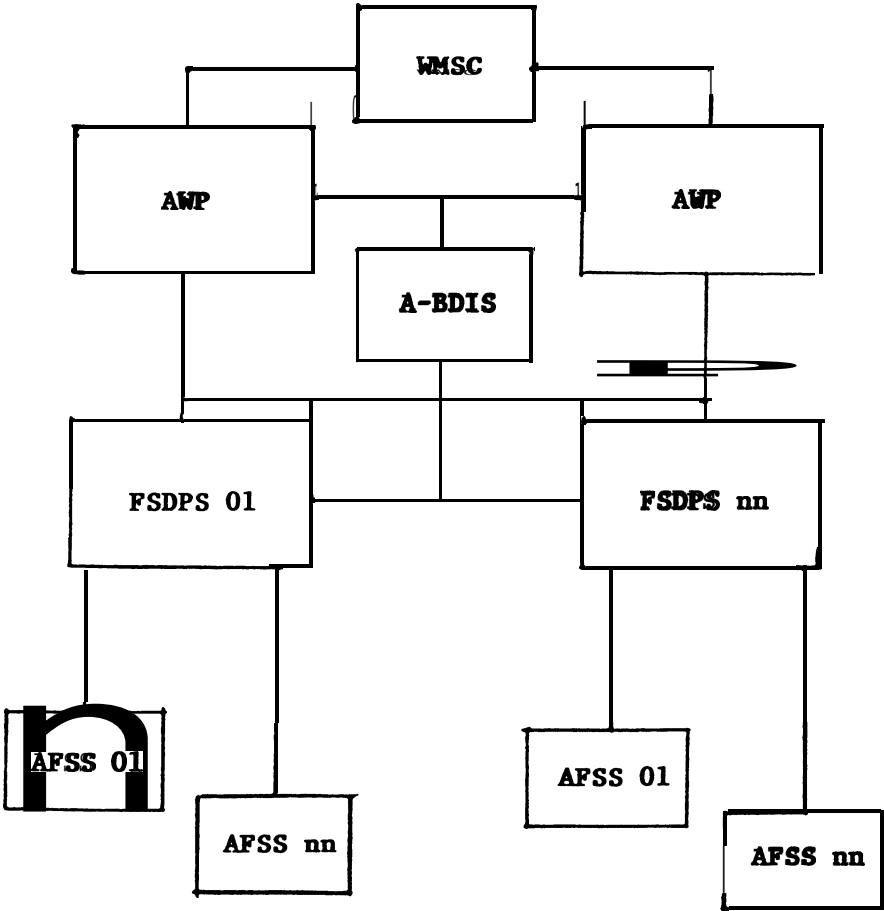


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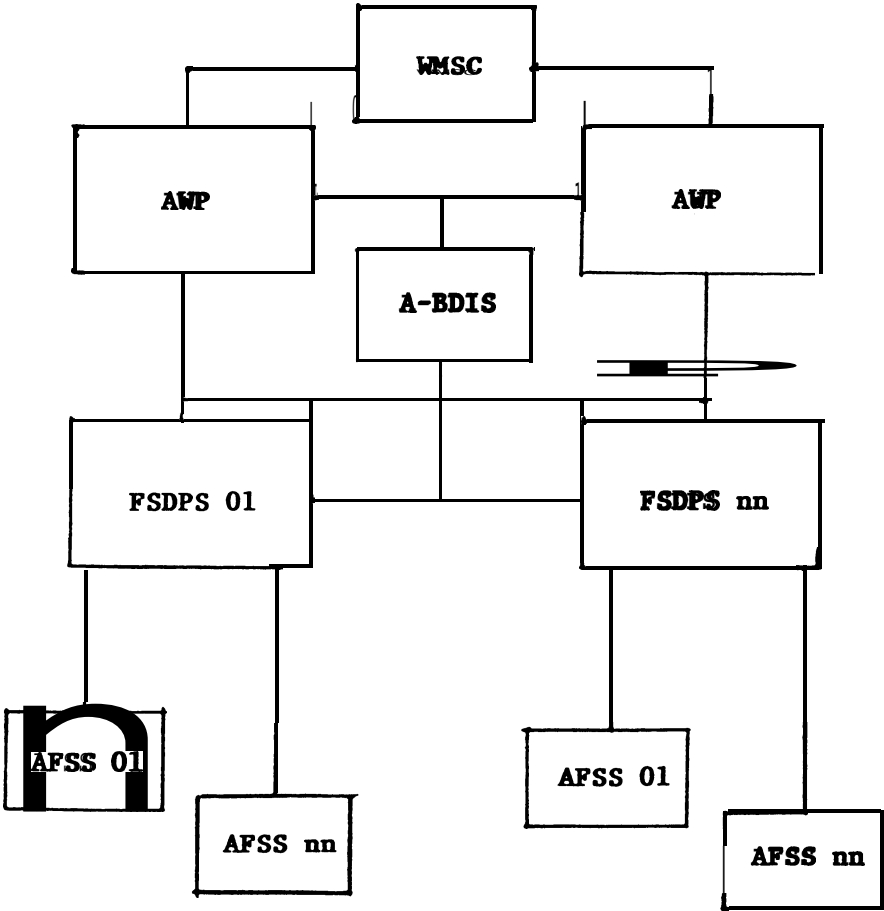


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3.3.1.4 Coded Time Source. - Each **FSDPS** shall be supplied with Coded Time Source (**CTS**) equipment meeting all the requirements of the **AWP CTS** as specified in Paragraph **3.4.4.** An antenna with the appropriate interface will be provided by the FM for use with the **CTS** interface.

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3.3.2 AFSS Position Equipment. - The **AFSS** position equipment shall provide a data entry and display, and maintenance function capability at the **AFSS.** The equipment shall support the specialists, supervisory, and maintenance personnel in the performance of flight service functions, and shall provide the functional interface between these operators and the data processing equipment. The **AFSS** position equipment shall interface directly with the **AFSS** data processing equipment.

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3.3.2.1 Position Console. The **AFSS** position equipment shall be installed by the contractor in government-owned console cabinets at the **AFSS** locations. All the position consoles shall have the display equipment described in **3.3.2.2,** and the data entry equipment described in **3.3.2.3.**

3.3.2.1.1 Deleted.

3.3.2.1.2 Deleted.

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3.3.2.1.8 Deleted.

to process the next failure, /samples taken during Design Qualification testing shall show conformance to the distributions defined by these points with a **95%** confidence level.

3.3.1.4 Coded Time Source. - Each **FSDPS** shall be supplied with Coded Time Source (**CTS**) equipment meeting all the requirements of the **AWP CTS** as specified in Paragraph **3.4.4.** An antenna with the appropriate interface will be provided by the FM for use with the **CTS** interface.

3.3.1.5 Deleted.

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3.8.3.1 AC Power. - The AC power shall enter each rack or equipment unit at a single point. Each rack or equipment unit with direct AC input power shall have the following control and indicators.

- (a) A front panel main power switch or circuit breaker.
- (b) A front panel lamp to indicate main AC power on.
- (c) A front panel indicating type fuseholder if circuit breakers are not used.

Any device used to make or break AC power shall operate on all conductors except the ground of a three wire single-phase line, and the neutral of a four wire three-phase **Wye** circuit. Switches or breakers for main AC power shall be installed adjacent to where the AC power enters the rack or equipment unit through a connector or terminal strip. The resistance to ground for each AC line conductor in a rack or equipment unit shall be at least one million ohms. Convenience outlets shall be provided on the bottom front of each rack or equipment unit. They shall be duplex receptacles with a separate circuit breaker and fed by an AC power bus separate from the automation equipment AC supply. AC power for assemblies mounted in a rack or equipment unit shall be provided through a power cord which is at least **3.28** feet (one meter) long with a ground wire and grounded connector. AC power conditioning equipment is not allowed in the operations room.

3.8.3.2 Grounding. - The Government will furnish the earth ground at FAA installations. The contractor shall furnish all other grounds. The contractor shall submit a grounding plan for approval prior to incorporation in the design and installation specifications. A minimum of two separate grounding networks shall be provided: AC ground and chassis/circuit ground. These networks shall be terminated at one point on a grounding terminal block to permit connection to earth or other continued grounds. Separate wires shall be used for power supply returns. Outer conductors of shielded wire shall not be used as signal or power returns. All chassis and assemblies shall be positively grounded to the rack or equipment unit ground bus with an **AWG#16** minimum size wire. The racks or equipment units shall be grounded by

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used to route cables to the interface panels shall not exceed one cable bundle per cabinet.

3.8.5.2 Interconnecting Cables. - All cables entering or leaving equipment cabinets shall do so through the rear bottom of the cabinets. Cable connectors shall be serviced from the rear of the cabinet. These cables shall be routed beneath the floor of the automation equipment areas and operation areas. **All** cables entering or leaving cabinets shall be numbered. The number shall be clearly marked on or attached to each end of all cables within **2.54** inches (**10** centimeters) of the connectors and at intervals not to exceed **16.4** feet (five meters). The marking scheme must have the approval of the contracting officer prior to implementation. The equipment shall be capable of driving interconnecting cables to consoles a minimum distance of **301.8** feet (**92** meters).

3.8.5.3 Power Cables. - All equipment power cables shall be provided by the contractor from the Government power distribution location to the various equipment units. This cabling requirement shall include all the junction boxes, fittings, switches, circuit breakers, and other distribution equipment between these points.

3.8.5.4 Connectors. - All of the connectors supplied with the equipment shall be selected and installed using ~~MIL-STD-454~~, requirement **10**, as a guide. Additionally, where two or more connectors (other than coaxial types) are used on an equipment unit, some positive means shall be provided to preclude interchanging of the mating connectors. Connectors shall be quickly and easily disconnected and reconnected.

3.8.5.5 Interface Cables. - The contractor shall fabricate, deliver, and install all cables and connectors between the contractor furnished equipment and external interfaces.

3.8.6 Identification Labels. - Each equipment unit, typically a system element having its own ON/OFF power control, shall have a nameplate. The design of the nameplate shall use FAA drawing **B-21216** shown as Figure 2 of **FAA-ER-650-021**, as a guide. Equipment titles and nameplate locations must have approval of the Government prior to implementation. Each equipment unit having a nameplate shall have a serial number starting with one and continuing consecutively up to the total number of such equipment units supplied.

3.9 System Reliability and Maintainability Programs. - The contractor shall plan and implement reliability and maintainability programs to meet the detailed performance requirements of this specification. The reliability program shall be structured in accordance with ~~MIL-STD-785~~, except as modified herein and the maintainability program shall be structured in accordance with ~~MIL-STD-470~~, except as modified herein. The **FSAS** and its various positional, functional, and operational elements shall be so designed and configured that in conjunction with the reliability requirements and the maintainability requirements, the availability requirements will be met. The requirements as imposed in this section are not exclusively hardware oriented. The requirements are primarily keyed to the **AFSS** position operational requirements.

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3.8.5.3 Power Cables. - All equipment power cables shall be provided by the contractor from the Government power distribution location to the various equipment units. This cabling requirement shall include all the junction boxes, fittings, switches, circuit breakers, and other distribution equipment between these points.

3.8.5.4 Connectors. - All of the connectors supplied with the equipment shall be selected and installed using ~~MIL-STD-454~~, requirement **10**, as a guide. Additionally, where two or more connectors (other than coaxial types) are used on an equipment unit, some positive means shall be provided to preclude interchanging of the mating connectors. Connectors shall be quickly and easily disconnected and reconnected.

3.8.5.5 Interface Cables. - The contractor shall fabricate, deliver, and install all cables and connectors between the contractor furnished equipment and external interfaces.

3.8.6 Identification Labels. - Each equipment unit, typically a system element having its own ON/OFF power control, shall have a nameplate. The design of the nameplate shall use FAA drawing **B-21216** shown as Figure 2 of **FAA-ER-650-021**, as a guide. Equipment titles and nameplate locations must have approval of the Government prior to implementation. Each equipment unit having a nameplate shall have a serial number starting with one and continuing consecutively up to the total number of such equipment units supplied.

3.9 System Reliability and Maintainability Programs. - The contractor shall plan and implement reliability and maintainability programs to meet the detailed performance requirements of this specification. The reliability program shall be structured in accordance with ~~MIL-STD-785~~, except as modified herein and the maintainability program shall be structured in accordance with ~~MIL-STD-470~~, except as modified herein. The **FSAS** and its various positional, functional, and operational elements shall be so designed and configured that in conjunction with the reliability requirements and the maintainability requirements, the availability requirements will be met. The requirements as imposed in this section are not exclusively hardware oriented. The requirements are primarily keyed to the **AFSS** position operational requirements.

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3.9.2.3.6 Parts and Material Control. - The contractor shall establish a parts control task to ensure proper application of all parts. The contractor shall delineate the means intended to assure that parts for new and modified designs are applied consistent with the requirements of ~~FAA-ER-650-021~~. Part applications in commercial equipment shall be within the parts ratings under all specified operational and storage conditions. Similarly, the deterioration rate shall be consistent with the service life as specified and shall be selected to minimize the replacement rates. Specification Control Drawings (**SCD**) shall be used by the contractor to procure all nonstandard parts used in new designs or modifications to existing designs. Each **SCD** shall contain the manufacturer's part number, a ~~JEDEC~~, ~~RETMA~~, or equivalent part number or designation, failure rate, level of screening required, electrical characteristics, physical characteristics, performance parameters, and any other descriptive information as required by ~~FAA-ER-650-021~~. **SCDs** shall be submitted to the Government for review and response.

3.9.2.3.7 Failure Reporting, Analysis, and Corrective Action. - The contractor shall establish a closed loop system for reporting all failures. A closed loop system is one in which the contractor's program management office receives individual failure reports and assures that the appropriate Engineering, Reliability, and Quality Assurance groups have performed the necessary analysis, repair, and corrective action. The level of failure reporting shall be to the part level. Additionally, for off-the-shelf hardware, the failure reports shall be provided to the respective supplier with recommendations for incorporation in its failure reporting system. The contractor and his suppliers shall resolve these failures as required by this paragraph. The reporting shall commence with the first application of power and continue through completion of testing. The failure report shall include all pertinent conditions concerning the failure occurrence in sufficient detail to permit an adequate and conclusive failure analysis. It shall include, as a minimum, the following:

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Failure data reports, including analysis results, shall be maintained by the contractor and shall be made available to the Government on request. The Government representative shall be notified of any failure within one working day of its occurrence.

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3.10.1.1 Master Installation Plan. - The contractor shall prepare a Master Installation Plan. This plan shall detail the contractor's efforts from delivery through completion of acceptance testing at a typical site and shall show how the contractor's schedule of efforts at successive sites meshes together for successful completion of contract schedule requirements. This plan shall also show all contractor efforts to be accomplished so that the system interfaces properly with the **GFE** facilities including characteristics such as environment, floor space layout, general cabling layout, power interfaces and distribution, and system interfaces with **GFE** systems. A floor plan layout shall be included for both the operations and equipment rooms in a typical facility. This plan shall show methodology and basic procedures the contractor intends to follow in performing system integration and checkout.

3.10.1.2 Site Installation Plan. - The contractor shall prepare a Site Installation Plan for each **AWP**, **FSDPS**, and **AFSS** site. All installation requirements, characteristics, or efforts which are unique to the site shall be detailed in the Site Installation Plan for that site. A floor plan layout for the operations and equipment rooms of the **AWP** and the equipment rooms of the **FSDPS** and **AFSS** shall be provided as a part of the Site Installation Plan for each respective site. These floor plan layouts shall use and update any floor plan layout guidance provided by the Government. The Government will determine the operations room floor plan layout for the **AFSS**. Each Site Installation Plan shall supplement the Master Installation Plan and may be submitted as Appendices to the Master Installation Plan.

3.10.1.3 Installation Planning Reports. - The contractor shall prepare an Installation Planning Report for each **AWP**, **FSDPS**, and **AFSS**. This report shall detail those aspects of the installation which the **Government** has agreed to provide. The information contained in **the reports** will be used by FAA field organizations to prepare the sites for **system** delivery and follow on installation and checkout activities. As a **minimum**, the **reports** shall contain the following information:

- (a) A system block diagram with a short narrative general description of the functional capabilities and hardware.
- (b) Typical floor plan layouts for control and equipment rooms and information on equipment placement limitations shall be included, e.g., maximum distances between equipment comprising the system, or new equipments already in place.
- (c) Detailed physical description of the equipment to be installed including physical size, weight, clearance factors, ventilation or airconditioning requirements, and cable entry and exit features.
- (d) Power requirements including information on the size and type of power cabling to be used, type and size of required **GFE** power panels, and circuit breaker requirements.
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- (c) Detailed physical description of the equipment to be installed including physical size, weight, clearance factors, ventilation or air conditioning requirements, and cable entry and exit features.
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4.3 Factory Tests. - A complete series of factory tests shall be performed on the **FSAS** equipment and software, and on operating and maintenance procedures. These factory tests shall demonstrate that all hardware, software, and performance requirements of this specification and of the contract are met. Factory tests shall be broken down into a minimum of three classes of testing. These classes are: Design Qualification Tests, Production Tests, and Type Tests. Within each of these classes there shall be up to three levels of testing. These levels are: Unit, Subsystem, and System. The factory test procedures shall list all test equipment and test software used, and for test equipment shall identify make, model, serial number, and certification data. The procedures shall have detailed step-by-step instructions with explanatory material to describe what is occurring. Test equipment interconnection with equipment under test shall be explicitly described in graphical and textual form. Functions, data interfaces, and interactions of test software shall also be clearly defined and identified in the test procedures. Procedural requirements apply to all classes and levels of testing.

4.3.1 Design Qualification Tests. - A complete series of design qualification tests shall be performed on the **FSAS** equipment. These design qualification tests shall be performed only on equipment and software intended for or used in the first production systems. These tests shall accomplish two purposes. First, the design qualification tests shall verify that the selected design, regardless of level of implementation, is adequate to fulfill its contribution toward meeting specification requirements. These tests shall verify that allocated function and performance requirements are fully satisfied. Second, the design qualification tests shall verify that the performance of the equipment and software at all levels of implementation is adequate to warrant commencement of other Government witnessed tests. The design qualification tests are not applicable at the component level. Government representatives shall be notified and shall be allowed to monitor and observe the contractor's testing and dry runs of testing that the contractor conducts in preparation for the Government witnessed unit, subsystem, and system level tests. Such notification shall be at least five working days prior to start of such tests or dry runs.

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